Contribution ID: **777** Type: **Poster**

ELM, Edge Turbulence and Their Interaction in the ELM-crash Suppression Phase under the n=1 RMP

Wednesday, 19 October 2016 14:00 (4h 45m)

The effect of static n=1 resonant magnetic perturbation (RMP) on edge-localized mode (ELM) and edge turbulence has been investigated using electron cyclotron emission imaging (ECEI) system. The ECEI revealed that filamentary ELM is still present in the edge when the ELM crash is completely suppressed by n=1 RMP. Correlation analysis showed the RMP enhances turbulent fluctuations in the edge toward the ELM-crash suppression phase. The spectral power distribution showed that edge turbulence has a linear dispersion for wide range of wavenumber and frequency. With velocimetry analysis, the turbulence has character of interchange mode which involves a net radial outward particle/heat transport. Bispectral analysis showed the nonlinear interaction between ELM and turbulent eddies, which implies that exchange of free energy between them may prevent the large ELM crashes.

Paper Number

EX/P4-15

Country or International Organization

Republic of Korea

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Session Classification: Poster 4

Track Classification: EXW - Magnetic Confinement Experiments: Wave–plasma interactions; current drive; heating; energetic particles